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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Karissa L. Eckert, et al

STABILIZED HIGH-SPEED
THERMALLY DEVELOPABLE
EMULSIONS AND
PHOTOTHERMOGRAPHIC
MATERIALS

Serial No. 10/715,199

Filed 17 November 2003

Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

Group Art Unit: 1752

Examiner: Schilling, Richard L.

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner For Patents, P.O. Box 1450, Alexandria, VA, 22313-1450.

Sherryl A. Payne
Sherryl A. Payne

5/6/2005
Date

DECLARATION UNDER 37 C.F.R. 1.131

We, Karissa L. Eckert, James B. Philip, Kumars Sakizadeh, and Doreen C. Lynch, hereby say and declare that:

- (1) We are the co-inventors of the invention described and claimed in the patent application identified above.
- (2) We have been for at least the last 3 years employed by Eastman Kodak Company in its facilities located in Oakdale, Minnesota.
- (3) During at least the last 3 years, as employees of Eastman Kodak Company, we have been involved in research and development work relating to imaging science and relating particularly to photothermographic compositions and materials and components thereof, and methods of imaging these materials to provide visible images.

(4) The presently claimed invention was conceived and reduced to practice in the United States of America prior to June 11, 2002, the priority date of U.S. Patent 6,576,410 (Zou et al.) that has been cited as prior art in the recent Office Action received from the USPTO.

(5) Prior to June 11, 2002, we conceived of and reduced to practice:

(I) a photothermographic composition for providing a black-and-white image, the composition comprising a binder, and in reactive association, a photosensitive silver halide, a non-photosensitive source of reducible silver ions that includes a silver salt of a compound containing an imino group, an ascorbic acid or reductone reducing agent for the non-photosensitive source of reducible silver ions, and

the composition further comprising a polycarboxylic acid that has a pKa of less than 4.5,

(II) a black-and-white photothermographic material comprising a support and having on at least one side thereon one or more thermally developable imaging layers comprising a binder, and in reactive association, a photosensitive silver halide, a non-photosensitive source of reducible silver ions that includes a silver salt of a compound containing an imino group, an ascorbic acid or reductone reducing agent for the non-photosensitive reducible silver ions, and optionally an outermost protective layer disposed over the one or more thermally developable imaging layers, and

wherein the outermost surface of the one or more thermally developable imaging layers, or the outermost surface of the protective layer if present, has a surface pH of less than 7, and the one or more thermally developable imaging layers further comprise a polycarboxylic acid that has a pKa of less than 4.5, and

(III) a method of forming a visible image comprising:

A) imagewise exposing the photothermographic material of the present invention to form a latent image,

B) simultaneously or sequentially, heating the exposed photothermographic material to develop the latent image into a visible image.

(6) Exhibit A is a true electrophotographic copy of notebook pages 192-194 in notebook BB9772 assigned to Karissa L. Eckert that are dated prior to June 11, 2002 and that describe a photothermographic composition and material and imaging method as claimed in the present application, except that irrelevant information has been obscured.

(7) In particular, notebook pages 192-194 of Exhibit A describe a photothermographic composition as having a binder identified as "Gel 30" on page 192, a photosensitive silver halide identified as "3076Bfy1 AgX" on page 192, a non-photosensitive source of reducible silver ions that includes a silver salt of benzotriazole identified as "AgBZT80" on page 192, ascorbic acid reducing agent identified as "AA" in Toner/Developer solution #1 on page 192, and citric acid, a polycarboxylic acid having a pKa less than 4.5, identified in solution #1 as "citric acid" on page 192.

In addition, page 192 identifies a support as "blue base" on which the photothermographic composition was coated to form a photothermographic material.

Page 192 describes the processing temperature of 150°C and page 193 describes processing conditions [15" (sec) and 150°C temperature] after exposure (in seconds) to radiation ("10⁻² exposure") in an imaging method to provide visible images in the photothermographic material and accompanying sensitometric results in the resulting images.

These features have been highlighted in yellow on pages 192-193 for the Examiner's convenience.

(8) Thus, Exhibit A demonstrates that conception and reduction to practice of the presently claimed invention were made prior to June 11, 2002.

(9) All statements made herein of our own knowledge are true and all statements made on information and belief are believed to be true, and that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

4-27-2005

Date

Karissa L. Eckert

Karissa L. Eckert

4-27-2005

Date

James B. Philip Jr.

James B. Philip

4/28/2005

Date

Kumars Sakizadeh

Kumars Sakizadeh

4/27/05

Date

Doreen C. Lynch

Doreen C. Lynch

Date _____

Problem: Thermal Solvents in Ag + in Ag/TC coatingsExperiment KE061402:

In this experiment three new thermal solvents were looked at: citric acid, 1,2,4-triazole, + diacetin. Adding 1,3-DEU to a coating w. a gel topcoat was also looked at. The 1,3-DEU was added to the silver, the silver + the topcoat, + the silver + the topcoat using a higher level of 1,3-DEU in the topcoat.

Make Sheet citric acid: OC(=O)C(O)C(=O)O mp: 153°C bp: decomposes
 1,2,4-triazole: c1nn[nH]1 mp: 119°C bp: 260°C
 diacetin: CCOC(=O)CCOC(=O)C mp: -30°C bp: 280°C

Make Sheet Below:

KE061402		Aqueous High-Speed Formulation							
If open 0.35-0.37 then sp2 is 4.9-5.1			0	1	2	3	4	5	6
Chemical	Concentration		Control	control w citric acid	control w 1,2,4-triazole	control w diacetin	control w gel TC, T/D in TC	Control w gel TC, T/D in TC, 1,3-DEU in Ag	control w gel TC, T/D in TC, 1,3-DEU in Ag and TC
AgBZT80	1706.5 g/mol	9.50 g	114.0 g						
EG Gel 30 (10.5 g gel/19.5 g H ₂ O)	35%	0.86 g	10.32 g						
15min/melt@50C									
MBTI (0.3 g MBTI, 5.7 g water)	5%	0.48 g	5.76 g						
10min/melt@50C									
NaBZT	0.7M	0.34 g	4.08 g						
Hold 90min @40C			adjust to 5.5 pH 30 minutes into 90 min hold time						
Alcohol		11.18 g / A	11.18 g / A	11.18 g / A	11.18 g / A	11.18 g / A	11.18 g / A	11.18 g / A	11.18 g / A
3075BFy1 AgX (melt @40C)	837 g/mol	0.98 g	0.98 g	0.98 g	0.98 g	0.98 g	0.98 g	0.98 g	0.98 g
Triazole Dispersion		none	none	none	none	none	none	none	none
Toner/Developer		TD1/2.8 g	TD1/2.8 g	TD1/2.8 g	TD1/2.8 g	TD1/2.8 g	TD1/2.8 g	TD1/2.8 g	TD1/2.8 g
Other			soln#1	soln#2	0.2g diacetin		0.58g soln#3	0.58g soln#3	0.58g soln#3
mks - 25sec then coat									
Ag Coating Gap (mf)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
TC coating Gap (mf)						4.2	4.2	4.2	4.2
TC formula									
gel						10 g gel 30 soln	10 g gel 30 soln	10 g gel 30 soln	10 g gel 30 soln
toner/developer solution						2.5g TD#1	2.5g TD#1	2.5g TD#1	2.5g TD#1
thermal solvent						none	none	0.58 g soln#3	0.87 g soln#3
Coating quality right off of the coater									
Coating quality of serial strips									
Processing	Blue base Dmsh0.17	150C	150C	150C	150C	150C	150C	150C	150C
soln#1 = 0.2g citric acid, 0.2g water									
soln#2 = 0.2g 1,2,4-triazole, 0.2g water									
soln#3 (20.0% solids) = 1.00g 1,3 diethylene, 4.18 g water									
gel 30 solution (7g) = 11.2 g gel 30, 58.8g water (melt at 40C)									
Toner/Developer solution #1 (15g) = BHTT/0.24g, BVSMO 45g, SUO 6g, DMUO 6g, AAPZ/0.3g, AAM/7g, H ₂ O/34.5g (hold at 35C)									
Drying T=124F/21 rev (18sec)									
Initial AgBZT big batch pH = 7.95, adjusted to 5.50									
Removed a couple of wraps from roll of base before using									
For adding things to silver soln:									
1. Weigh out AgBZT									
2. Weigh out AgX									
3. Weigh out additives (benzyl alcohol or sucrose soln)									
5. Add toner/developer									
8. Stir 25 sec									

15226

Signature Rauin Eckert

The foregoing disclosed to me on _____

Witness b. busline

Exhibit A

Date . . .

Prize Stability Results

Haze	
Height	Proc.
0	36.7
1	36.3
2	
3	96.4
4	47.8
5	53.8
6	53.6
7	52.7
8	52.5
9	
10	38.4
11	38.6

Description	Initial LTLS Sens: 15°, 1500c BSU, 10 ⁻² exposure											1 week NA LTLS Sens: 15°, 1500c BSU, 10 ⁻² exposure												
	Dmin	Dmax	Spd2	AC-1	TC-1	TC-2	Spd1	spd2/min	mod dmin	mod spd2	mod dmin/mod spd2	Ag Cl WL	Dmin	Dmax	Spd2	AC-1	TC-1	TC-2	Spd1	Ag Cl WL	delta dmin	delta dmax	delta spd2	delta spd1
Control	0.296	2.228	4.481	****	0.423	0.589	5.348	15.14	0.32	4.51	14.20	2.42	0.371	2.106	4.149	****	0.322	0.541	5.234	2.45	0.075	-0.122	-0.332	-0.114
control w citric acid	0.290	2.208	4.231	****	0.323	0.517	5.059	14.59	0.32	4.28	13.33	2.35	0.320	2.185	4.359	****	0.470	0.527	5.325	2.24	0.030	-0.023	0.128	0.266
control = 1,2,4-triazole (positive acting system run-down)	0.863	1.476	****	****	****	****	6.725	****	0.86	****	****	2.62	v. fogged											
control = desferal	0.445	2.618	5.641	****	0.229	0.926	6.013	12.68	0.43	5.62	13.12	2.70	v. fogged											
control = gel TC, T/D in TC	0.285	2.233	4.282	****	0.391	0.580	5.259	15.02	0.29	4.28	15.02	2.60	0.384	2.167	4.103	****	0.424	0.588	5.351	2.51	0.099	-0.066	-0.179	0.092
Control = gel TC, T/D in TC, 1,3-DEU in Ag	0.425	2.777	5.409	0.879	0.391	0.862	5.900	12.73	0.44	5.42	12.46	2.54	0.947	2.711	4.877	****	0.387	0.736	5.968	2.57	0.522	-0.066	-0.532	0.068
control = gel TC, T/D in TC, 1,3-DEU in Ag and TC	0.395	2.768	5.326	0.952	0.424	0.807	5.845	13.48	0.39	5.32	13.72	2.65	0.980	2.750	4.971	****	0.469	0.545	5.836	2.59	0.585	-0.018	-0.335	-0.009
Control = gel TC, T/D in TC, 1,3-DEU in Ag, 1 Sal 1,3-DEU in TC	0.406	2.649	5.278	0.861	0.388	0.835	5.805	13.00	0.42	5.30	12.51	2.49	0.834	2.684	5.014	****	0.453	0.688	5.728	2.41	0.428	0.035	-0.264	-0.077
control = gel TC, 1,3-DEU in Ag	streaky												streaky											
Control = gel TC, 1,3-DEU in TC and Ag	streaky												streaky											
Control = 1,3-dimethylthiurea	0.303	2.505	4.663	0.866	0.385	0.703	5.469	15.39	0.29	4.65	15.92	2.70	0.457	2.464	4.408	****	0.388	0.465	5.391	2.58	0.154	-0.041	-0.255	-0.078
	0.315	2.457	4.988	0.800	0.283	0.920	5.601	15.83	0.32	4.99	15.78	2.59	0.744	2.492	4.869	****	0.380	0.674	5.723	2.60	0.429	0.033	-0.119	0.121

Description	Initial LTLS Sens: 20°, 150oC BSU, 10 ⁻² exposure												Initial LTLS Sens: 20°, 150oC BSU, 10 ⁻² exposure, unprocessed Ag side away from drum											
	Dmin	Dmax	Spd2	AC-1	TC-1	TC-2	Spd1	spd2/dmin	mod dmin	mod spd2	mod dmin/mod spd2	Ag CL WL	Dmin	Dmax	Spd2	AC-1	TC-1	TC-2	Spd1	Ag CL WL	dmin drms	dmax drms	spd2	dmin spd1
Control	0.309	2.482	4.771	****	0.280	0.737	5.533	15.44	0.34	4.82	14.05	2.34	0.268	0.698	****	****	0.246	0.235	3.759	2.52	-0.041	-1.784	#VALUE!	-1.774
control = citric acid	0.304	2.444	4.813	0.922	0.345	0.838	5.494	15.83	0.35	4.89	13.97	2.26	0.283	1.064	****	****	0.280	0.405	4.238	2.33	-0.021	-1.380	#VALUE!	-1.256
control = 1,2-ethanediol (positive acting system resulted)																				2.05	0.000	0.000	0.000	0.000
control = diethanol	0.836	2.780	5.447	****	0.506	0.737	5.913	6.52	0.91	5.49	6.06	2.40	0.303	2.057	1.742	****	0.278	0.914	5.664	2.45	-0.533	-0.723	-0.705	-0.249
control = gas TC, TAO in TC	0.320	2.885	4.972	1.332	0.461	0.755	5.568	15.54	0.32	4.97	15.48	2.59	0.279	0.667	****	****	0.227	0.256	3.626	2.90	-0.042	-2.218	#VALUE!	-1.943
control = gas TC, TAO in TC, 1,3-DEU in Ag	0.567	2.886	5.556	1.176	****	0.981	6.006	9.80	0.59	5.58	9.43	2.49	0.345	1.396	****	****	0.248	0.796	5.576	2.65	-0.222	-1.490	#VALUE!	-0.430
control = gas TC, TAO in TC, 1,3-DEU in Ag and TC	0.579	2.894	5.585	1.237	0.216	1.053	6.026	9.65	0.59	5.60	9.45	2.54	0.298	1.992	4.173	****	0.343	0.542	5.240	2.65	-0.281	-0.902	-1.412	-0.786
control = gas TC, TAO in TC, 1,3-DEU in Ag 1 to 1,3-DEU in TC	0.658	2.791	5.493	****	0.224	1.019	5.967	8.35	0.73	5.55	7.63	2.35	0.346	1.734	3.661	****	0.441	0.499	5.150	2.50	-0.312	-1.057	-1.832	-0.817
control = gas TC, 1,3-DEU in Ag	strucky																				#####	0.000	0.000	0.000
control = gas TC, 1,3-DEU in TC and Ag	strucky																				#####	0.000	0.000	0.000
Control	0.371	2.841	5.286	1.228	0.347	0.847	5.768	14.25	0.36	5.26	14.79	2.71	0.281	0.728	****	****	0.242	0.337	3.746	2.84	-0.090	-2.113	#VALUE!	-2.022
Control = 1,3-dimethylurea	0.351	2.594	5.246	0.884	0.335	0.934	5.705	14.95	0.39	5.30	13.70	2.36	0.285	1.662	3.687	****	0.319	0.373	4.860	2.42	-0.066	-0.932	-1.559	-0.845

Signature

Kaum Schutz

Witness

6. Beschleunigung

The foregoing disclosed to me on

RESEARCH / DEVELOPMENT

EASTMAN KODAK COMPANY

ate _____

Problem: Thermal Solvent in Ag + in Ag / TC coatings
Sensitometry Results (cont.)

		Initial LTLS Sensi: 25°, 1500C BSU, 10"-2 exposure													
Trat	Description	Dmin	Dmax	Spd2	AG-1	TC-1	TC-2	Spd1	spd2/dmin	mod dmin	mod spd2	mod dmin/mod spd2	Ag Cl Wt		
0	Control	0.449	2.710	5.170	1.180	0.383	0.929	5.749	11.31	0.49	5.21	10.72	2.40		
1	control w citric acid	0.331	2.548	5.283	1.240	0.333	0.884	5.696	15.96	0.36	5.33	14.69	2.37		
2	control w 1,2,4-triazole (positive acting system resulted)														
3	control w diacetin														
4	control w gel TC, T/D in TC	0.397	3.047	5.457	1.503	0.356	0.749	5.950	13.75	0.40	5.46	13.60	2.57		
5	Control w gel TC, T/D in TC, 1,3-DEU in Ag	0.802	2.939	6.278	0.554	****	1.185	6.351	7.83	0.80	6.28	7.86	2.61		
6	Control w gel TC, T/D in TC, 1,3-DEU in Ag and TC	0.830	2.920	5.882	0.676	***	0.806	6.126	7.09	0.82	5.88	7.14	2.62		
7	Control w gel TC, T/D in TC, 1,3-DEU in Ag, 1.5% 1,3-DEU in TC	0.951	2.725	6.179	****	****	1.243	6.262	6.50	0.97	6.19	6.38	2.55		
8	Control w gel TC, 1,3-DEU in Ag	streaky													
9	Control w gel TC, 1,3-DEU in TC and Ag	streaky													
10	Control	0.444	2.988	5.473	1.447	0.141	1.062	5.878	12.33	0.42	5.44	13.09	2.78		
11	Control w 1,3-dimethylurea	0.398	2.745	5.450	1.105	0.284	0.856	5.818	13.69	0.42	5.49	12.94	2.44		

Conclusions + Comments:

Conclusion and Notes:

- 1) The initial AgBZT big batch pH was 7.96 and this was adjusted to 5.50 with H₂SO₄.
- 2) Three new thermal solvents were screened in the Ag layer: citric acid, 1,2,4-triazole, and diacetin. The 1,2,4-triazole resulted in some sort of positive acting system. Adding the diacetin resulted in an increase in dmin, spd, and dmax. At 20 sec processing the dmin was very high for this coating, around 0.8, this is not surprising because diacetin is a liquid at room temp. Adding diacetin did improve the sensitometry seen when processing away from the drum. Adding citric acid did not increase reactivity much, in fact at 25sec processing this coating had lower dmin than the control and slightly better spd. Adding citric acid did help sensitometry seen when processed away from the drum a little but not to the extent of some of the other thermal solvents, this is not surprising because the citric acid has a melting point above our processing temperature.
- 3) The other thing looked at in this experiment was coating a control with a gel topcoat with 1,3-DEU in either the silver or in both the topcoat and the silver. I attempted to test this with and without toner/developer added to the topcoat, unfortunately all of the coatings where the toner/developer was left out of the gel topcoat ended up coating very streaky. Usually any coating with a topcoat on it loses more sensitometry when processed backwards than the control. This happened again. Adding 1,3-DEU to the silver layer improved this some. Adding 1,3-DEU to both the silver and the topcoat layers further improved the sensitometry seen when processing away from the drum. Adding 1,3-DEU to the silver and a higher level of 1,3-DEU to the topcoat hurt the sensitometry a little bit so that it wasn't quit as good as adding 1,3-DEU to the silver and the topcoat at the lower level. For initial sensitometry all of the coatings with 1,3-DEU had a dmin around 0.5-0.6 at 20 sec processing and a spd2 around 5.5, (control w gel topcoat was dmin = 0.32, spd2=5.0. This is excepting the coating with 1,3-DEU in the Ag and 1,3-DEU at a higher level in the topcoat; this coating had higher dmin than the others.
- 4) For 1 week NA all of the coatings with 1,3-DEU had much worse dmin gain than the control. The coating with diacetin added was totally fogged and the coating with citric acid in it actually had better dmin aging than the control.
- 5) For desktop stability there wasn't a whole lot of difference between coatings. For viewbox stability all of them were about the same except for the control w gel topcoat coating which was about 0.2 delta dmin better than the control.

Signature

Kevin Eckert

The foregoing disclosed to me on _____

Witness

G. Burdew